# Growth status of Saudi patients with cleft lip and palate

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## ABSTRACT

**Objectives:** The purpose of this study was to determine if the type of cleft had any influence on the growth achievement of the affected patients.

**Methods:** The height, weight and head circumference of 63 cleft patients attending the Orthodontic clinic at the College of Dentistry, King Saud University, Riyadh, Kingdom of Saudi Arabia between the year 2000-2001, were compared with each other according to the type of cleft present. In addition, a comparison was made between the height and weight of cleft subjects with that of the normal population.

**Results:** The most common type of cleft present was unilateral cleft of the lip and palate, followed by bilateral cleft of the lip and palate, and cleft lip. When the height, weight and head circumference of cleft patients was compared, no significant difference could be found between any groups. In addition, no significant difference could be found between height and weight of cleft patients versus that of the normal population.

**Conclusion:** We can conclude from this study, that normal achievement of height, weight and head circumference is to be expected in children with cleft of the lip with or without cleft of the palate.

**Keywords:** Cleft lip and palate, height, weight, head circumference.

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The assessment of the health status and growth of cleft patients is an important task. This assessment not only helps provide the clinician with baseline data for monitoring these patients, but also helps to compare their growth status with that of their normal counterparts. Growth alterations or deficiencies are recognized, and proper management and referral of these patients can take place. It is well recognized that in the early months of life, children with clefts appear to exhibit non-satisfactory growth.[1-4] This deficiency in growth maybe apparent at a later stage through short stature or underdevelopment in weight.[5,6] Whether this growth problem persists throughout life or is followed by a recovery phase of normal growth after postnatal surgery, is still a subject of controversy and concern for those handling these types of patients. Hence, the purpose of this study was 2 fold: To explore the influence and severity of cleft type on the height, weight and head circumference of cleft patients, and to compare height and weight measurements of cleft patients with that of non-cleft subjects, in order to determine if a significant difference exists between normal children and those affected with clefts.

Methods. ***Subjects.*** Cleft patients attending the Orthodontic clinic at the College of Dentistry, King Saud University, Riyadh, Kingdom of Saudi Arabia (KSA) were selected for the purpose of this study. The Orthodontic clinic cares for cleft patients referred from health centers within the Capital City,

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Riyadh (King Khalid University Hospital), in addition to centers outside the Capital. The sample consisted of 63 cleft patients with an average age range of 6-25 years of age. For the purpose of this study, the various types of cleft lip and palate were grouped into the following categories: cleft lip (CL), unilateral cleft lip and palate (UCLP), bilateral cleft lip and palate (BCLP), cleft palate only.

***Data collection.*** Data was collected over a one-year period. During that time, patients that had attended the Orthodontic clinic were screened, and medical and dental notes were reviewed in every case in order to retrieve information regarding the health status and medical condition of each subject. All cleft patients had their primary surgical repair of the cleft lip between 1-3 months of age, while repair of the cleft palate was undertaken at approximately 12-18 months of age. Any patient with a recognizable syndrome or major associated abnormality capable of affecting normal postnatal growth, were excluded from the study.

***Measurements.*** In order to determine the growth status of cleft patients, the following measurements were taken of each cleft patient:

***Height.*** This was measured to the nearest 0.1 cm using a measuring rod attached to the weighing scale with a sliding headpiece. Subjects were instructed to stand straight on the platform with no shoes and with their heels placed together and their bodies vertical. The head was positioned in the natural head position (the external auditory meatus and the lower border of the orbit parallel to the floor), with the head-rod touching the subject's head.

***Weight.*** The weighing scale used was the Seca Lever type (Seca, Germany) that reads up to the nearest 100 gm. Subjects were weighed with minimal and lightweight clothes and no shoes.

***Head circumference.*** Subjects were instructed to stand with their head in the natural head position and arms relaxed. A measuring tape with a centimeter grade scale was passed around the most anterior and posterior protrubence of the forehead and occiput in order to obtain the maximum head circumference. Normal growth data was obtained from previous epidemiological and anthropometric studies undertaken on Saudi children within the Kingdom.[7-12] This was carried out in order to compare the normal height and weight achievement of children with those of clefts.

***Statistical analysis.*** Data entry and analysis was carried out using the Statistical Package of Social Sciences Program. The age of cleft subjects and non-cleft subjects were grouped into 3 different categories according to prepubertal, pubertal, and post-pubertal growth periods. This facilitated the comparison between the height, weight, and head circumference of cleft patients according to the cleft type and their different age groups, and was required due to the limited number of cases over the one-year course of this study. Descriptive statistical analysis was used to calculate means, standard deviations, and standard errors. The comparison of sample means was carried out using a one-way ANOVA. The ANOVA compares the within-group variance with the between-groups variance. Non-parametric measures (Kolmogorov-Smirnov Z test) were used to determine if any of the means were significantly different from others. A p value of $< 0.05$ was considered significant.

## Results.

***Cleft types, sex and ages.*** The total sample of patients obtained was 63 cases of clefts. **Table 1** shows the distribution of the cleft cases according to the type of cleft present. The age of the patients ranged from 6 years to 25 years of age. The most frequently encountered cleft was UCLP followed by BCLP, and CL. The most commonly affected side with a cleft was the left side in both UCLP and CL. Males presented more frequently with CL and UCLP (11.1% and 25.4% versus 3.2% and 17.5%), while BCLP was almost equally present in both sexes (19.0% versus 17.5%).

***Height, weight and head circumference of cleft patients.*** **Table 2** shows the mean height, weight, and head circumference of each cleft type according to their age group. Since only one case of isolated left of the palate was found (only one case from the 63 cleft cases), it was not included in the statistical descriptions. **Table 3** demonstrates the comparison of height, weight and head circumference of CL, UCLP, and BCLP with the different age groups. As can be seen from the table, no significant difference was apparent between the type of the cleft in regards to height, weight or mean head circumference (MHC), and the different age groups ($p>0.05$).

***Comparison of cleft children and non-cleft children.*** Since one of the objectives of this study was to determine if a difference existed between the

**Table 1 -** Cleft types and percentage present in each category.

| Cleft type | Frequency N (%) |
|---|---|
| CL | 11 (17.5) |
| UCLP | 28 (44.4) |
| BCLP | 23 (36.5) |
| Cleft palate | 1 (1.6) |
| **Total** | **63 (100)** |

CL -cleft lip, UCLP - unilateral cleft of the lip and palate, BCLP - bilateral cleft of the lip and palate, N - number.

**Table 2 -** Height, weight and head circumference of subjects with CL, UCLP and BCLP.

| Age groups | Measure | Cleft type | N | Mean | SD | SE |
|---|---|---|---|---|---|---|
| 6-<10 years | Height | UCP | 9 | 125.09 | 11.42 | 3.81 |
| | | BCP | 9 | 121.58 | 17.32 | 5.77 |
| | Weight | UCP | 9 | 25 | 7.35 | 2.45 |
| | | BCP | 9 | 19.68 | 2.82 | 0.94 |
| | Head circumference | UCP | 9 | 51.59 | 2.06 | 0.69 |
| | | BCP | 9 | 51.31 | 1.49 | 0.495 |
| 10-≤14 years | Height | CL | 1 | 148.50 | - | - |
| | | UCP | 8 | 142.61 | 18.62 | 6.58 |
| | | BCP | 4 | 139.58 | 8.69 | 4.35 |
| | Weight | CL | 1 | 41.7 | - | - |
| | | UCP | 8 | 39.65 | 21.09 | 7.46 |
| | | BCP | 4 | 33.48 | 8.21 | 4.10 |
| | Head circumference | CL | 1 | 54.9 | - | - |
| | | UCP | 8 | 52.86 | 1.61 | 0.57 |
| | | BCP | 4 | 53.7 | 2.38 | 1.19 |
| >14 years | Height | CL | 10 | 163.36 | 6.92 | 2.19 |
| | | UCP | 11 | 163.91 | 7.75 | 2.34 |
| | | BCP | 10 | 160.31 | 11 | 3.48 |
| | Weight | CL | 10 | 62.03 | 14.68 | 4.64 |
| | | UCP | 11 | 62.2 | 18.59 | 5.6 |
| | | BCP | 10 | 49.9 | 9.77 | 3.09 |
| | Head circumference | CL | 10 | 55.78 | 2.50 | 0.79 |
| | | UCP | 11 | 54.75 | 1.89 | 0.57 |
| | | BCP | 10 | 54.61 | 1.69 | 0.53 |

CL - cleft lip, UCLP - unilateral cleft lip and palate, BCLP - bilateral cleft lip and palate,
SD - standard deviation, SE - standard error of mean, N - number.

**Table 3 -** Comparison of height, weight and head circumference between CL, UCLP and BCLP subjects (ANOVA).

| Age groups | Measure | SS | df | MS | F | Sig |
|---|---|---|---|---|---|---|
| 6-<10 years | Height | 55.48 | 1 | 55.48 | 0.258 | 0.619 |
| | Weight | 127.47 | 1 | 127.47 | 4.118 | 0.059 |
| | Head circumference | 0.347 | 1 | 0.347 | 0.107 | 0.747 |
| 10-≤14 years | Height | 68.55 | 2 | 34.28 | 0.13 | 0.88 |
| | Weight | 117.26 | 2 | 58.63 | 0.18 | 0.84 |
| | Head circumference | 4.72 | 2 | 2.36 | 0.67 | 0.53 |
| >14 years | Height | 77.04 | 2 | 38.52 | 0.51 | 0.61 |
| | Weight | 1011.57 | 2 | 505.79 | 2.26 | 0.12 |
| | Head circumference | 8.28 | 2 | 4.14 | 0.99 | 0.38 |

CL - cleft lip, UCLP - unilateral cleft lip and palate, BCLP - bilateral cleft lip and palate,
SS - sum of squares, df - degrees of freedom, MS - mean square, Sig - significance level at $p<0.05$, N - number.

**Table 4** - Comparison between height and weight of normal subjects versus subjects with clefts (NPar test).

| Age groups | Cleft type | Measure | N | Mean | KS | Asymp. sig. |
|---|---|---|---|---|---|---|
| 6-<10 years | UCLP | Height | 9 | -2.4 | 0.564 | 0.91 |
| | | Weight | 9 | -2.6 | 0.61 | 0.8 |
| | BCLP | Height | 9 | -5.9 | 0.67 | 0.76 |
| | | Weight | 9 | -7.9 | 0.45 | 0.99 |
| 10-≤14 years | UCLP | Height | 8 | -4.1 | 0.74 | 0.65 |
| | | Weight | 8 | -5.6 | 0.81 | 0.53 |
| | BCLP | Height | 4 | -7.1 | 0.64 | 0.80 |
| | | Weight | 4 | -11.7 | 0.59 | 0.88 |
| 14> years | UCLP | Height | 11 | 9.3 | 0.47 | 0.98 |
| | | Weight | 11 | 8.3 | 0.60 | 0.86 |
| | BCLP | Height | 10 | 5.7 | 0.351 | 1 |
| | | Weight | 10 | -4 | 0.71 | 0.69 |
| | CL | Height | 10 | 8.8 | 0.40 | 0.99 |
| | | Weight | 10 | 8.1 | 0.43 | 0.99 |

CL - cleft lip, UCLP - unilateral cleft lip and palate, BCLP - bilateral cleft lip and palate, NPar - non-parametric statistical analysis
KS - Kolmogorov-Smirnov Z test, Asym. sig. - 2 tailed significance level, (note: significance level at $p<0.05$), N - number.

growth status of cleft children and with that of non-cleft children, mean values of height and weight of non-cleft children were obtained from previous reports regarding this matter.[7-9,12] **Table 4** displays these measurements and compares the average normal recordings to that of the cleft measurements. From the results of this study no significant difference was evident between the height and weight of cleft subjects versus that of the normal population ($p>0.05$).

Discussion. The presence of a congenital anomaly affecting the orofacial structures such as cleft lip or palate, or both, maybe thought to have its adverse influence on the growth status and achievement of subjects affected with such an anomaly. One might expect that the more severe the cleft type, the more affect it may have on the physical development of these patients. This notion was not apparent in this study. When height, weight, and head circumference of subjects with CL, UCLP, and BCLP, were compared in all age groups, no significant difference could be found. Leading to the conclusion that patients with cleft of the lip with or without cleft of the plate exhibited similar growth patterns. The most commonly type of cleft present was UCLP, followed by BCLP and CL. This is in agreement with Kumar et al[13] who conducted a study on facial clefts in KSA, and found that UCLP was present more frequently than BCLP. But in their study, CL was equally present as was cleft of the lip and palate. The left side was also found to be the most commonly affected side in the present study rather than the right. Males presented more frequently than females with CL and UCLP. While females presented as equally as their male counterparts with BCLP. This is in disagreement with Kumar et al[13] and Borkar et al[14] who reported that males presented more frequently with CL, UCLP, and BCLP than their female counterparts, but that females were affected more with isolated cleft of the palate.[13,14] When growth of cleft patients was compared with that of the normal population, no significant differences could be found in any age group. This is in disagreement with several studies that report a difference between subjects affected with CL with or without cleft palate and isolated cleft palate, and with those not affected.[5,15-17] These studies reported a shorter stature in cleft patients, and caution that patients with UCLP and with isolated cleft of the palate, are at an elevated risk for growth delay or deficit. It should be noted however that in the present study, only one patient presented with isolated cleft of the palate and a comparison could not be made between this cleft type and the normal population. On the other hand, Lee et al[18] evaluated the growth status of cleft patients from birth to 4 years of age.[18] They concluded that the group as a whole grew relatively poorly in early infancy but subsequently recovered attaining both expected height and weight by the age of 25.5 months. They also noted that children with isolated cleft of the palate showed the most abnormal growth. Lee et al[18] concluded that while cleft of the palate was

associated with significant growth faltering in early infancy, rapid recovery took place following surgical repair and this appeared to have resulted in no residual growth deficit.

A study conducted by Ranalli and Mazaheri[4] also agrees with the concept that an early lag period of growth occurs in infants with clefts, but by 3 years of age, children with clefts catch-up to the normal growth of children within the same age range. As health care workers that deal with cleft patients, monitoring of their growth status should be a must in order to determine if normal achievement of growth is attained. We can expect that short term weight faltering is commonly seen amongst children with clefts of the secondary palate, but this could be only of a short-term nature. From the results of this study we can conclude that following reparative surgery, children with UCLP, BCLP, and CL usually show catch up and there appears to be no lasting effect on either height or attained weight.

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